CASE REPORT

Diagnosis of a biliary cystadenoma demonstrating communication with the biliary system by MRI using a hepatocyte-specific contrast agent

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ABSTRACT. Biliary cystadenomas are predominately benign tumours that have a low malignant potential. We present a case of a 30-year-old female with a histopathological confirmation of a biliary cystadenoma following resection. The diagnosis was made pre-operatively by MRI using the hepatocyte-specific contrast agent gadobenate dimeglumine [Gd-BOPTA (MultiHance; Bracco Diagnostics Inc., Princeton, NJ)]. At the biliary excretory phase, delayed phase images demonstrated communication between the multilocular cystic mass and the biliary tree, which helped to confirm the diagnosis of biliary cystadenoma. This highlights the beneficial use of hepatocyte-specific agents for their dual function as an extracellular agent and a hepatobiliary agent.

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Case report

A 30-year-old female with a history of diabetes, hypertension, polycystic ovary syndrome and a previous cholecystectomy presented with upper abdominal pain radiating to her back. Clinical examination revealed no significant features and the laboratory blood results, particularly the liver function tests, were normal. An ultrasound scan of the abdomen revealed an atypical cystic lesion in the liver. A dedicated liver MRI scan using gadobenate dimeglumine [Gd-BOPTA (MultiHance; Bracco Diagnostics Inc., Princeton, NJ)] was performed to further characterise the lesion. The MRI scan suggested that the lesion was a biliary cystadenoma and this was reinforced by demonstrating communication between the lesion and biliary tree at the delayed hepatobiliary phase (Figure 1). The patient underwent a right hemihepatectomy, made an uneventful recovery and remains well. The histological analysis confirmed the diagnosis of biliary cystadenoma (Figure 2).

Discussion

Biliary cystadenomas are uncommon, accounting for <5% of all uni- or multilocular cysts of biliary origin. They occur most frequently in middle-aged females [1]. Cystadenomas are considered to be pre-malignant because they can progress to cystadenocarcinoma; therefore,

surgical excision is the treatment of choice. There are no dedicated imaging features to support the diagnosis of cystadenoma or cystadenocarcinoma. However, the presence of irregular wall thickening, mural solid nodules, thick calcification and papillary projections are suggestive of a cystadenocarcinoma [2].

MRI is the optimum diagnostic tool for the detection and characterisation of focal liver lesions. MultiHance is a gadolinium-based contrast agent that combines the properties of a conventional extracellular fluid (ECF) agent with those of a liver-specific agent. After administration, it initially resembles any conventional ECF contrast agent. However, approximately 3–5% of the injected dose is then taken up by functioning hepatocytes and excreted into the biliary system [3]. Using this property, it is possible to ascertain if there is a communication between a lesion and the biliary system. Identifying this communication may aid surgical planning.

Communication between biliary cystadenomas and the bile duct has previously been demonstrated by invasive tests, such as endoscopic retrograde cholangiopancreatogram or percutaneous transhepatic cholangiogram [4]. The delayed 2 h images corresponding to the hepatobiliary excretion phase show a clear uptake of the contrast agent within the lesion, confirming the communication between the lesion and biliary tree. There is an exhaustive differential diagnosis for biliary cystadenoma/cystadenocarcinoma that includes simple or haemorrhagic cysts, hydatid cysts, liver abscess, undifferentiated embryonal sarcoma, ciliated hepatic foregut cysts and cystic mesenchymal hamartoma [2]. Other cystic lesions that can potentially communicate with the biliary tree include a segmental form of Caroli disease and the cystic

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Figure 1. (a) T_2 weighted image shows a cystic lesion with internal septations. (b) Pre-contrast T_1 weighted fat saturated image. (c) T_1 weighted fat saturated image in the arterial phase illustrates minimal wall enhancement. (d) T_1 weighted fat saturated image in the portal venous phase. (e) T_1 weighted fat saturated image in the equilibrium phase. (f) T_1 weighted fat saturated delayed imaging at 2 h illustrates the lesion filled with contrast, implying communication with the biliary system. Note there is contrast in the common bile duct.

Figure 2. Pathology slide shows part of the lining of the biliary cystadenoma within the background liver. The cystadenoma is lined with bland columnar epithelial cells.

variant of intraductal papillary neoplasm of the bile duct [5]. Therefore, any additional imaging feature that can help in limiting the differential diagnosis is of great importance.

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